

REMARKS

Claims 1 - 12 are pending.

Affirmation is made of an election of claims 1 - 12 made during a telephone conversation with the examiner on August 8, 2002 in response to a restriction requirement. Claims 13 - 15 have been canceled without prejudice.

Claims 1, 3 - 5, and 7 were rejected under 35 U.S.C. Section 102 based on Kohara et al. (U.S. Pat. No. 4,654,966). Claims 1 - 5 and 7 - 12 were rejected under 35 U.S.C. Section 102 based on Watanabe et al. (U.S. Pat. No. 5,844,311). Claim 6 was rejected under 35 U.S.C. Section 103 in view of Watanabe et al. and Switky et al. (U.S. Pat. No. 5,270,262). Claims 5 - 6 were rejected under 35 U.S.C. Section 112, Second paragraph.

Fig. 5 has been amended to include a legend to designate the figure as prior art.

Claims 5 and 6 have been amended to more clearly recite that the intervening member is "slidably disposed between the frame and the cap" (claim 5), and that the intervening member "comprises plastic material" (claim 6). As amended, claims 5 and 6 are believed to conform to the requirements of Section 112, 2<sup>nd</sup> paragraph. The rejection is therefore believed to be overcome.

The invention as recited in the pending claims relates to a sealing structure. A wiring board for mounting semiconductor devices is provided with a frame around its periphery. A cap is provided over the semiconductor devices for conducting heat from the devices via a heat conductive material. The cap and frame are joined via an intervening member.

Claim 1 has been amended to recite an additional aspect of the invention in which the cap and the frame are spaced apart by the intervening member. Claim 9 has been similarly amended, reciting a cap being fastened to a first and second frame via an intervening member wherein the cap is spaced apart from the first and second frames by the intervening member. This aspect of the invention is fully supported in the various

illustrative embodiments of the invention shown in Figs. 1 - 4, and discussed on page 4, lines 28 and following. No new matter has been added.

The references to Kohara et al. and to Watanabe et al., each shows a frame disposed on a wiring board and a cap disposed in direct contact with the frame. For example, Fig. 1 of Kohara et al. shows module base board 7 and a flange 2 which is asserted to be inherently in contact with the module base board. A gasket 4 is disposed on the inner surface of the flange. The heat sink 1 is disposed in direct contact with the flange 2 and fixed thereto by screws 3. See also Fig. 11. Kohara et al. do not show “an intervening member disposed between the frame and the cap such that the frame and the cap are spaced apart” (claim 1) or a “cap being spaced apart from the first and second frames by the intervening member” (claim 9). Furthermore, Kohara et al. disclose that “the flange 2 is mounted to the heat sink 1 with the screws 3 for airtight sealing” and so do not suggest spacing the heat sink apart from the flange. Col. 5, lines 13 - 14.

Similarly, Watanabe et al. show in Fig. 1A a substrate 11 having mounted thereon devices 12. A frame 15 is provided on the substrate. A heat sink 17 is provided atop the frame and are fastened together by bolts 10, with an O-ring 19 held therebetween. Col. 4, lines 46 - 66. It can be seen in the figure there is direct contact between the heat sink 17 and the frame 15. Consequently, Watanabe et al. do not show “an intervening member disposed between the frame and the cap such that the frame and the cap are spaced apart” (claim 1) or a “cap being spaced apart from the first and second frames by the intervening member” (claim 9).

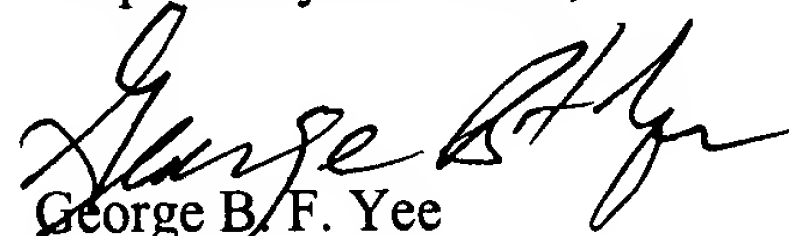
Neither of the references discloses the “cap spaced apart from the frame” aspect of the invention as recited in the pending claims. The Section 102 rejections are therefore believed to be overcome.

The Section 103 rejection of claim 6 is believed to be overcome for at least the reason that Watanabe et al. do not show the elements of claim 1 from which claim 6 depends.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

  
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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE SPECIFICATION:**

Please amend the paragraph beginning on page 4, line 28 as follows:

A gap allowing for the precision of assembly and the difference in thermal expansion is provided between the side face of the inside middle stage of the upper frame 10 ~~and~~ and that of the circumference of the air-cooled heat sink 7, and a fine gap is provided between the upper face of the frame 5 and the under face of the circumference of the air-cooled heat sink 7 to avoid their contact while maintaining the hermetic sealing provided by the rubber O ring 15. Thus deformation of the module in its vertical direction is restrained by preventing the air-cooled heat sink 7 from constraining relative thermal deformation in the horizontal direction of the upper frame 10, frame 5 and wiring board 1.

**IN THE CLAIMS:**

Please amend claims 1, 5, 6, and 9 as follows:

- 1           1.       (Amended) A sealing structure for multi-chip modules, comprising:  
2               a wiring board having one face mounted with a plurality of semiconductor devices  
3           and another face having connecting pins arranged thereover;  
4               a frame having a thermal expansion rate compatible with that of the wiring board,  
5           provided on the circumference of that face of the wiring board mounted with the semiconductor  
6           devices;  
7               a cap covering the plurality of semiconductor devices, the cap having a thermal  
8           expansion rate different from that of the frame;  
9               a heat conducting material provided between the plurality of semiconductor  
10          devices and the cap for transmitting heat generated by the plurality of semiconductor devices to  
11          the cap;  
12          an attachment for fixing the frame and the wiring board to each other; and

13 an intervening member disposed between the frame and the cap such that the  
14 frame and the cap are spaced apart, for joining the frame and the cap being joined to each other  
15 via the intervening member.

1 5. (Amended) A sealing structure for multi-chip modules as in claim 1  
2 wherein the intervening member ~~comprises a sliding member~~ is slidably disposed between the  
3 frame and the cap.

1 6. (Amended) A sealing structure for multi-chip modules as in claim 5  
2 wherein the ~~sliding~~ intervening member comprises plastic material.

1 9. (Amended) A sealing structure for multi-chip modules comprising:  
2 a wiring board having one face mounted with a plurality of semiconductor devices  
3 and another face having connecting pins arranged thereover;  
4 a first frame having a thermal expansion coefficient compatible with that of the  
5 wiring board, the first frame provided on a periphery of the face of the wiring board mounted  
6 with the semiconductor devices;  
7 a second frame disposed over the first frame;  
8 a cap having a circumference and having a thermal expansion coefficient different  
9 from that of the first and second frames and covering the plurality of semiconductor devices;  
10 a heat conducting material disposed between the cap and the plurality of  
11 semiconductor devices for transmitting heat from the semiconductor devices to the cap;  
12 an attachment to fix the first frame and the wiring board to each other; ~~and~~  
13 a fastener for fastening the first and second frames and the cap together via an  
14 intervening member-<sub>1</sub>  
15 the cap being spaced apart from the first and second frames by the intervening  
16 member.